APPENDIX I—REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

This Reasonably Foreseeable Development Scenario is based on information in the Minerals Potential Report (March 30, 2006) and applies to the entire planning area (i.e., federal and private estate). The analysis window for the Minerals Potential Report (15 years) was extended to match the 20-year planning horizon for the Resource Management Plan (RMP). The reasonably foreseeable development estimates developed in the Minerals Potential Report were adjusted based on discussions with the Minerals Potential Report author (Utah Geological Survey) and the minerals specialist on the ID Team.

LEASABLE MINERALS

Oil and Gas

Based on historic rates, drilling in the planning area during the next 20 years could be expected to involve 90 new well sites. Approximately 70 well sites would be new exploration wells, and 20 sites would be new production wells. Table AI-1 summarizes the expected number of wildcat and development wells to be drilled for oil and gas in each play in the planning area and totals the number of wells for the next 20 years.

Table AI-1. Summary of Petroleum Development Potential and Expected Number of Wells Drilled in the Next 20 Years for Each Play in the Planning Area

Play Name	Occurrence Potential	Development Potential	New Wells
Late Proterozoic/Cambrian play	moderate	low	10
Devonian-Pennsylvanian play	high	moderate	19
Permo-Triassic Unconformity play	high	high	32
Combined Cretaceous plays	moderate	low	9
Total New Exploration Wells			**70**
Total New Development Wells (one very small field)			**20**
GRAND TOTAL EXPECTED WELLS			**90**

Expected Disturbance From Oil and Gas

The expected level of disturbance from the projected 90 oil and gas wells was determined using reasonable assumptions about a generic well site and access needs. Each well pad was estimated to comprise three acres, a square area roughly 361 feet per side. Based on an analysis of the network of existing roads, it was estimated that reaching each new well site would require an average of 5 miles of new road to be constructed, and the new roads would disturb a path almost 33 feet wide. Thus, each mile of new road would disturb 4 acres. An estimate of the total surface disturbance for all 90 new wells follows:

90 oil and gas well pads at 3 acres each = 270 acres, plus

450 miles of new roads at 4 acres/mile = 1800 acres.

Thus, the total surface disturbance for the 90 new exploration wells is 2,070 acres, or approximately 23 acres per well.

Expected Disturbance From Seismic Activities

Seismic exploration would likely occur before any projected drilling begins. Only a small amount of seismic exploration has been carried out in the planning area. Covering the portion of planning area that has high development potential for oil and gas could entail shooting and collecting up to 1,500 line miles of seismic data.

The disturbance involved with shooting and collecting up to 1,500 line miles of seismic data would likely be split between buggy-mounted and helicopter data acquisition methods. Assuming that buggy-mounted drill rigs could be used to acquire half the seismic data and that the other half required heli-portable drilling rigs, means that there would be 750 line miles of each type of disturbance. Buggy-mounted seismic data acquisition generally disturbs about 1.2 acres per mile, while helicopter-acquired data disturbs only 0.007 acres per mile according to recent Bureau of Land Management (BLM) environmental assessments (i.e., Veritas and Western Geco Uinta Basin projects) for similar seismic projects elsewhere in Utah. Thus, acquiring 1,500 miles of seismic data in the portion of the planning area prospective for petroleum would entail a total disturbance of 905.5 acres of the forest surface (900 acres for buggy-mounted data and 5.5 acres for helicopter data). Combining the seismic disturbance with the drilling disturbance means that exploration and development for oil and gas in the planning area during the next 20 years could be expected to disturb about 2,976 acres of the surface. Because reclamation of all seismic disturbance and about 70 percent of exploration well disturbance is expected to occur during the planning period, about 2,370 acres of surface disturbance will be reclaimed during the planning horizon, leaving a net disturbance from oil and gas during the next 20 years of 607 acres.

Coal

Alton Coal Development, LLC, has announced plans to surface mine at least 40 million tons of coal from the Alton area of the Alton coal field within the planning area, an area of high (H) development potential. The Cannonville and Skutumpah areas of the Alton coal field and the portions of the Kaiparowits Plateau and Kolob coal fields with thicker coals are rated as having moderate (M) development potential, whereas all other coal-bearing areas are rated as low (L) development potential. Preliminary plans would mine the coal from private surface/federal subsurface (about 1,300 acres) first and then expand onto adjacent federal surface/federal subsurface (about 2,300 acres). The estimated total surface disturbance from mining of federal coal in the decision area will entail about 3,600 acres, including haul roads and surface facilities. The average annual surface disturbance would be approximately 180 acres, and reclamation would follow shortly behind mining. Federal coal lands have not been leased, a mine permit does not exist, and no coal sales contract has been signed, but a good chance exists that coal mining will occur in the Alton area. In addition to the mining of federal coal, preliminary plans would mine coal from private surface/fee coal (about 800 acres) for a total cumulative surface disturbance of 4,400 acres in the planning area. The average annual total surface disturbance would be approximately 220 acres. The operator is coordinating the application for mining of fee coal through the State of Utah.

Geothermal

No geothermal exploration or development activity is expected in the planning area in the next 20 years; thus, no accompanying surface disturbance will occur. Interest in geothermal resources could be affected if renewable energy portfolio standards and incentives are legislatively adopted.

LOCATABLE MINERALS

Uranium-Vanadium

No uranium-vanadium exploration or development activity is expected in the planning area in the next 20 years; thus, no accompanying surface disturbance will occur.

Antimony

No antimony exploration or development activity is expected in the planning area in the next 20 years; thus, no accompanying surface disturbance will occur.

Gypsum

Only very small-scale gypsum exploration and development activity is expected in the planning area in the next 20 years. There will be limited to small-scale extraction of blocks of alabaster for use in making carvings, but this surface disturbance activity is considered part of the stone extraction activities discussed below.

Limestone

No limestone exploration and development activity is expected in the planning area in the next 20 years. Although the occurrence potential for limestone is rated as high (H/D) in some parts of the planning area, the area lacks good resource definition, and better defined deposits occur closer to the major Utah markets. Therefore, the development potential of limestone deposits in the planning area is rated low (L) for the foreseeable future.

Septarian Concretions

Continued septarian concretion development activity is expected in the planning area in the next 20 years at rates similar to historic activity levels. Thus, septarian concretion mining will likely disturb about 1 acre per year, resulting in a total 20-year surface disturbance of 20 acres. Nearly all future disturbance is expected to take place on State lands.

SALABLE MINERALS

Sand and Gravel

Continued, to slightly increased, sand and gravel exploration or development activity is expected in the planning area in the next 20 years at rates comparable to historic activity levels. The level of disturbance will likely be about 20 acres per year for the first 5 years, 30 acres per year for the second 5 years, about 35 acres per year for the third 5 years, and 40 acres per year for the last 5 years of the planning horizon. Sand and gravel development will result in a total 20-year surface disturbance of 625 acres, with approximately 70 percent on BLM lands, approximately 15 percent on Forest Service lands, and approximately 15 percent on State and private lands. Reclamation will occur when the mineral material within the site is exhausted and the site is closed.

Stone

Continued stone exploration or development activity is expected in the planning area in the next 20 years at rates that will increase slightly from historic activity levels. Thus, about 20 acres will likely be disturbed per year for stone, resulting in a total 20-year surface disturbance of 400 acres. About 70 percent of the disturbance is expected to be on BLM land, 20 percent expected on State lands, and 10 percent on U.S. Forest Service lands. Reclamation will occur when the mineral material within the site is exhausted and the site is closed.

Clay

Very limited clay exploration or development activity is expected in the planning area in the next 20 years; thus, only 5 acres of accompanying surface disturbance will occur, mainly recurrent use at existing pits for use as pond lining material.

Humate

No humate exploration or development activity is expected in the planning area in the next 20 years; thus, no accompanying surface disturbance will occur.

In summary, Table AI-2 tallies the total expected surface disturbance in the planning area from energy and mineral development during the next 20 years.

Table AI-2. Total Expected Surface Disturbance in the Planning Area From Energy and Mineral Development During the Next 20 Years

Activity	Average Annual Disturbance	Cumulative Disturbance
Petroleum Drilling	103.5 acres	2,070 acres
Petroleum Seismic	45.3 acres	906 acres
Coal Mining	220.0 acres	4,400 acres
Septarian Concretion Mining	1.0 acre	20 acres
Sand and Gravel Mining	31.3 acres	625 acres
Stone Mining	20.0 acres	400 acres
Clay Mining	0.3 acres	5 acres
Grand Total	**421.4 acres**	**8,426 acres**
Reclaimed Oil and Gas	118.5 acres	2,370 acres
Reclaimed Coal Mining	100.0 acres	2,000 acres
Net Disturbance	**202.9 acres**	**4,056 acres**